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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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|-----------------|-------------|----------------------|---------------------|------------------|

10/523,239

09/28/2005

Franz Schuler

10808/206

6476

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02/05/2009

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EXAMINER

SALERNO, SARAH KATE

ART UNIT

PAPER NUMBER

2814

MAIL DATE

DELIVERY MODE

02/05/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/523,239 | Applicant(s) SCHULER ET AL. | |
| | Examiner SARAH K. SALERNO | Art Unit 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 7-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/16/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/7/08 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5, 6, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawai et al. (US Patent 5,675,173).

Claim 1: Kawai teaches a semiconductor component with trench isolation for defining active regions in a semiconductor substrate, the trench isolation comprising (FIG. 2):

a deep isolation trench (4) with a first covering insulation layer (6) below a surface of the semiconductor substrate and a second covering insulation layer (10) over the first covering insulation layer and above the surface of the semiconductor substrate, a side wall insulation layer (6) and an electrically conductive filling layer (9), which is

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electrically connected to a predetermined doping region of the semiconductor substrate in a bottom region of the isolation trench; and

further comprising:

a trench contact which comprises: a deep contact trench with a side wall insulation layer (6) and an electrically conductive filling layer (9), which is likewise electrically connected to the predetermined doping region of the semiconductor substrate in a bottom region of the contact trench; a trench contact insulation layer (10) above a surface of the electrically conductive filling layer; and a contact opening (12) through the trench contact insulation layer and in contact with the surface of the electrically conductive filling layer.

Claim 2: Kawai teaches the first covering insulation layer (6) is within the isolation trench (FIG. 2).

Claim 3: Kawai teaches the trench isolation and the trench contact have a larger depth than an associated depletion zone in the semiconductor substrate (FIG. 2).

Claim 5: Kawai teaches the predetermined doping region comprises a doping well comprising a multiple well structure (FIG. 2).

Claim 6: Kawai teaches the semiconductor substrate comprises Si (Col. 1), the covering insulation layer and side wall insulation layer comprise SiO₂ (Col. 1), and the filling layer comprises highly doped polysilicon (Col. 2).

Claim 15: Kawai teaches a gate oxide layer (11) over a surface of the second covering insulation layer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawai et al. (US Patent 5,675,173), as applied to claim 1 above, and further in view of Joy et al. (US Patent 4,454,647 of record).

Regarding claim 4, as described above, Kawai substantially reads on the invention as claimed, except Kawai does not teach the trench isolation further comprises a widened, shallow isolation trench at a surface of the semiconductor substrate configured for filling non-active regions. Joy teaches the trench isolation further comprises a widened, shallow isolation trench (14) at a surface of the semiconductor substrate configured for filling non-active regions to improve the performance of the device (FIG. 4; Col. 3). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device taught by Kawai to include the a widened, shallow isolation trench at a surface of the semiconductor substrate to improve device performance as taught by Joy (FIG. 4; Col. 3).

Response to Arguments

6. Applicant's arguments with respect to claims 1-6 and 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH K. SALERNO whose telephone number is (571)270-1266. The examiner can normally be reached on M-F 8:00-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. K. S./
Examiner, Art Unit 2814

/Theresa T. Doan/
Primary Examiner, Art Unit 2814